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| 10/722,213      | 11/25/2003  | Kris Senecal         | NA-1174 D1          | 7033             |

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U.S. Army Soldier and Biological  
Chemical Common  
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AMSSB-OCC(N)  
Natick, MA 01760

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| EXAMINER |
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TORRES VELAZQUEZ, NORCA LIZ

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| ART UNIT | PAPER NUMBER |
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1771

DATE MAILED: 08/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/722,213

Applicant(s)

SENECAL ET AL

Examiner

Norca L. Torres-Velazquez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments and amendment with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. Independent claim 1 is rendered indefinite herein because it claims a polymer solution including a conductive polymer and conducting nanoparticles. It is noted that a "solution" by definition includes a solute and a solvent. The claim further claims that said solution is selected from a group of polymers.

- b. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "solution" in claim 1 is used by the claim to mean "a mixture of polymers with nanoparticles", while the accepted meaning is "that a solution includes a

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solute and a solvent.” The term is indefinite because the specification does not clearly redefine the term. The claim fails to provide for a solvent.

c. It is further noted that the “whereby” language used in the claim suggests or makes optional but does not limit a claim to a particular structure therefore, it does not limit the scope of the claim or the claim limitation.

d. Claim 6 is redundant, independent claim 1 already claims a conducting polymer.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a conductive polymer membrane article that comprises a nonwoven membrane of polymer fibers formed from a solution that includes a matrix polymeric material, a conductive polymer and conductive particles in a solvent, does not reasonably provide enablement for a polymer “solution” formed of only solutes. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

For examining purposes, the Examiner has drafted the invention to be as follows:

Claim 1. A conductive polymer membrane article, having a conductivity selected from the group consisting of electrical, ionic and photoelectric,

said article comprising:

a nonwoven membrane of polymer fibers, wherein at least some of the fibers have diameters of less than one micron;

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said polymer fibers are formed from a solution (*or spin dope*) that include:

a matrix polymeric material, a conductive polymer and conducting nanoparticles

said matrix polymeric material include a polymer selected from the group consisting of polyurethane (PU), polyethylene oxide (PEO), polyacrylonitrile (PAN), polylactic acid (PLA), polyvinyl acetate (PVA), and cellulose acetate; and a solvent

said conductive polymer selected from the group consisting of polyaniline, polypyrrole, polythiophene, polyphenol, polyacetylene and polyphenylene

said nonwoven membrane has an electrical conductivity of at least about  $10^{-6}$  S/cm

Claim 2. The conductive polymer membrane article of claim 1 wherein said matrix polymeric material further includes a photo-reactive dye, said dye being selected from the group consisting of phthalocyanines, ruthenium complexes with organic ligands, porphyrins, and polythiophenes.

Claim 3. The conductive polymer membrane article of claim 4 wherein the nonwoven membrane produces a current of at least  $10^{-9}$  amps/cm<sup>2</sup>.

Claim 4. The conductive polymer membrane article of claim 2 wherein the nonwoven membrane includes photonic absorption and is photoelectric.

Claim 5. The conductive polymer membrane article of claim 2 wherein the conducting nanoparticles are embedded in the polymer fibers.

Claim 6. The conductive polymer membrane article of claim 2 wherein the polymer fibers further include a conducting polymer.

Claim 7. The conductive polymer membrane article of claim 1 wherein the conductivity is created by the inclusion of the conducting polymer in said polymer fibers.

Claim 8. The conductive polymer membrane article of claim 1 wherein the conductivity is created by the inclusion of conducting nanoparticles embedded in the membrane polymer fibers.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 7-8 are rejected under 35 U.S.C. 102(b) as anticipated by RODRIGUEZ et al. (US 5,972,499).

RODRIGUEZ et al. discloses materials that include a bicomponent fiber, made of a nonconductive component including a first fiber forming polymer, a conductive second component, including carbon particles and a second fiber-forming polymer such as cellulose acetate, polyacrylonitrile; and a conductive third component, including a polymer selected from the group consisting of polypyrrole and polyaniline. (Abstract) The reference teaches that the invention is not only limited to fibers, but also other formed polymer articles such as fabrics and plastic sheets, and the like. The reference further teaches that the conductive polymer blend should be in solution, in a dispersion in water or a solvent. (Col. 5, lines 1-12) The Examiner gives a broad definition to the term “textile” of the reference to include nonwoven fabrics. The reference teaches that the conductive polymeric fiber have a resistivity from about  $10^1$  to  $10^4$  ohms per square. (Col. 3, lines 45-47) The reference defines the term “conductive” as having a surface resistivity between  $10^0$ - $10^{11}$  ohms per square; a “highly conductive” material having a resistivity between  $10^0$ - $10^4$  ohms per square. (Col. 1, lines 18-21) Therefore, it is the Examiner’s interpretation that the materials taught by the reference provide the claimed electrical conductivity. *[1 ohm =  $1.113 \times 10^{-12}$  s/cm] If for example, the material has a resistivity of  $10^4$*

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*ohms, then it has a conductivity of  $1.113 \times 10^{-2}$  s/cm.* Based on the process of making the material taught by the reference, it is the Examiner's interpretation that the carbon particles are embedded in the fibers of the invention. With regards to the carbon particles claimed herein as nanoparticles, it is noted that the Specification of the present invention does not provide a range of values that define the term, therefore, the Examiner gives a broad interpretation and interprets the carbon particles of the prior art to read on such limitation. It is further noted that the individual filament deniers are in the range of 0.5 denier/filament up to 30 denier/filament. (Col. 4, lines 50-51) It is noted that the fibers denier range taught by the reference includes microfibers that comprise the diameters claimed herein.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over RODRIGUEZ et al. as applied above, and further in view of ANGELOPULOS et al. (US 5,997,773).

The limitation in claim 2 would have been obvious in the art, because it is a common practice in the art to form a conductive composition where a polythiophene (known to be a photo-reactive compound) is incorporated to another conductive polymer such as a polyaniline. (Abstract; Col. 1, lines 10-31; Col. 2, lines 18-47; claim 1)

Although RODRIGUEZ et al. and ANGELOPULOS et al. do not explicitly teach the claimed current, photonic absorption and that is photoelectric, it is reasonable to presume that

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this property is inherent to material of RODRIGUEZ et al. in combination with the teachings of ANGELOPULOS et al. Support for said presumption is found in the use of like materials (i.e. fibers with similar diameters formed by similar polymeric materials and conductive components, made by spinning). The burden is upon Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property of a current of at least  $10^{-9}$  amps/cm<sup>2</sup> would obviously have been present one the product from the combination of RODRIGUEZ et al. and ANGELOPULOS et al. is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection made above under 35 USC 102.

Reliance upon inherency is not improper even though rejection is based on Section 103 instead of Section 102. *In re Skoner, et al.* (CCPA) 186 USPQ 80

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

KINLEN et al. (US 5,911,930)

KULKARNI et al. (US 5,290,483)

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37



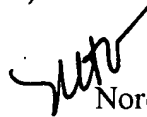
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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Norca L. Torres-Velazquez whose telephone number is 571-272-1484. The examiner can normally be reached on Monday-Thursday 8:00-5:00 pm and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Norca L. Torres-Velazquez  
Primary Examiner  
Art Unit 1771

August 12, 2005